Stoller
Hanford Office

DOE-EM/GJ1134-2006

299-W18-73 (A7556)
Log Data Report

Borehole Information:

Borehole:	299-W-18-73 (A7556)		Site:	216-Z-12 Crib	
Coordinates (WA State Plane)		GWL (ft)[1]:	None	GWL Date:	11/28/05
North	East	Drill Date	TOC[2] Elevation	Total Depth (ft)	Type
135408.186	566363.127	03/67	686.27	25	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	2.1	6 5/8	6	5/16	2.1	25

Borehole Notes:

Casing diameter and casing stickup measurements were acquired by the logging engineer using a caliper and steel tape. Measurements were rounded to the nearest 1/16 in. All logging measurements are referenced to the top of casing.

Kasper (1982) reports six shallow wells (70 through 75) were drilled in the 216-Z-12 crib in 1967 to determine if discharged waste was being dispersed over the entire bottom area of the crib. "The wells were drilled until alpha contamination was encountered, or a few feet below where it could be expected to be encountered." (quote from Crawley, 1967; reference unavailable). Using a portable radiation survey instrument ("poppy"), no activity was detected in well 73. This well is located at the approximate midpoint of the southern two-thirds of the crib adjacent to the distribution pipe near the center line of the crib. It was concluded that the flow of the waste to the crib was insufficient to distribute the liquid over the entire crib bottom. As a result, in July 1968, a diversion pipe was installed in the crib, bypassing the first 100 ft of the distributor pipe. From July 1968 to May 1973, when the crib was retired, waste was discharged only to the southern two-thirds of the crib (Kasper 1982).

The driller's log reports the drilling was terminated at 25 ft. The maximum depth achieved with the SGLS was 20 ft (17.9 + 2.1 stickup).

Logging Equipment Information:

Logging System:	Gamma 4E		Type:	SGLS (70%) 34TP40587A
Effective Calibration Date:	12/21/04	Calibration Reference:	DOE/EM-GJ854-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat			
Date	12/09/05	12/09/05			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	17.5	17.5			
Finish Depth (ft)	2.5	17.5			
Count Time (sec)	200	1000			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A	N/A			
Pre-Verification	DE081CAB	DE081CAB			
Start File	DE081000	DE081016			
Finish File	DE081015	DE081016			
Post-Verification	DE081CAA	DE081CAA			
Depth Return Error (in.)	0	0			
Comments	No fine-gain adjustment.	No fine-gain adjustment. Count time 1000 s			

Logging Operation Notes:

Logging was conducted December 9, 2005 using SGLS logging system Gamma 4E. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K, ^{238}U, and ^{232}Th) verifier with serial number 115. An additional measurement was acquired near the bottom of the borehole at 17.5 ft at enhanced counting time (1000 seconds) to lower the MDL for the detection of possible transuranic contamination that exists in the crib. All measurements were performed with a centralizer installed on the sonde. The top of casing is the reference depth for log data.

Analysis Notes:

Analyst:	Henwood	Date:	02/09/06	Reference:	GJO-HGLP 1.6.3, Rev. 1

SGLS pre-run and post-run verification spectra were collected at the beginning and end of the day. All of the verification spectra were within the acceptance criteria. Examinations of spectra indicate that the detector functioned normally during logging, and the spectra are accepted.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source files G4EApr05.xls). Log data were corrected for a casing thickness of 5/16-in.

Results and Interpretations:

No manmade radionuclides were detected in this borehole except for ^{137}Cs at the ground surface and 11.5 ft. The concentrations are near the MDL of approximately 0.1 pCi/g. A spectrum acquired for 1000 seconds at the bottom of the borehole also indicated no evidence of contamination.

As described in the "Borehole Notes" section, this borehole was not found to exhibit contamination when it was drilled in 1967. Current log data corroborate that finding and supports the conclusion by Kasper (1982) that contamination was not dispersed over the entire bottom area of the crib, even after a diversion pipe was installed in 1968 to distribute contamination to the southern two-thirds of the crib.

Westinghouse Hanford Company (WHC) logged this borehole in 1993 with the Radionuclide Logging System (RLS) to a depth of 14.1 ft from ground surface. WHC reported no manmade contaminants.

List of Plots:

Man-Made Radionuclides
Natural Gamma Logs
Combination Plot (1 in. = 20 ft)
Combination Plot (1 in. = 5 ft)
Total Gamma and Dead Time

References

Kasper, R.B., 1982. *216-Z-12 Transuranic Crib Characterization: Operational History and Distribution of Plutonium and Americium,* RHO-ST-44, Rockwell International, Richland, Washington.

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[1] GWL – groundwater level
[2] TOC – top of casing
[3] N/A – not applicable

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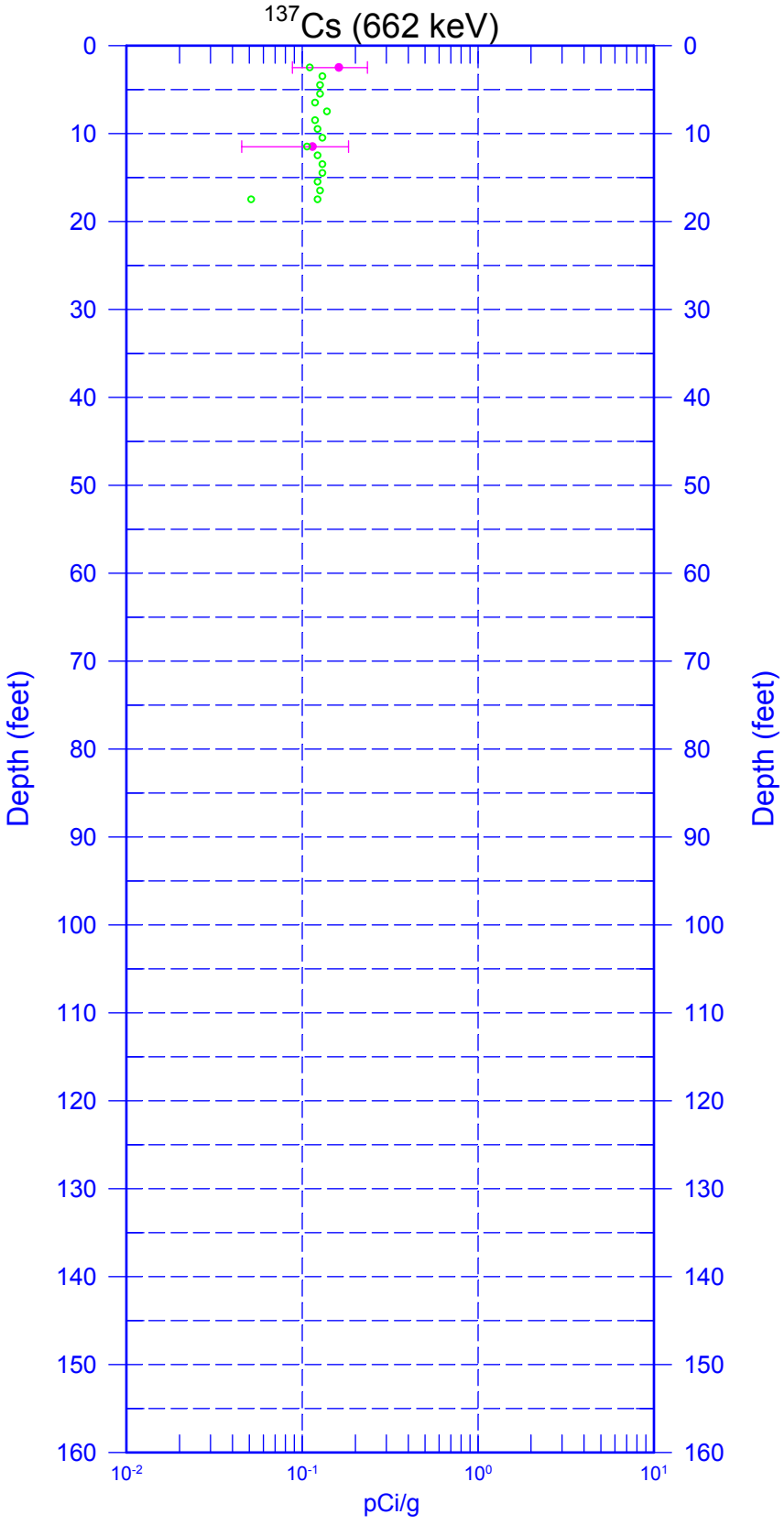
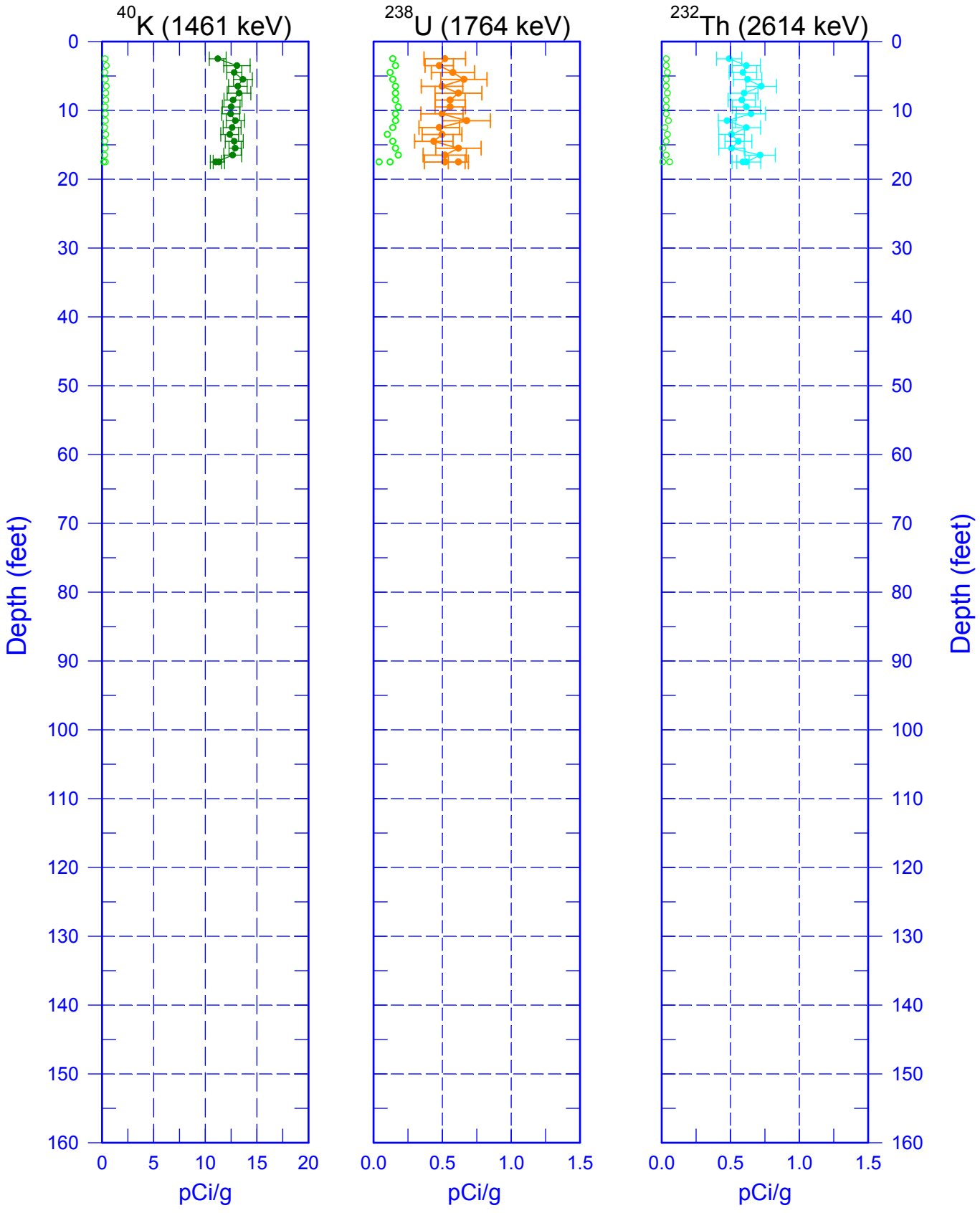
Man-Made Radionuclides



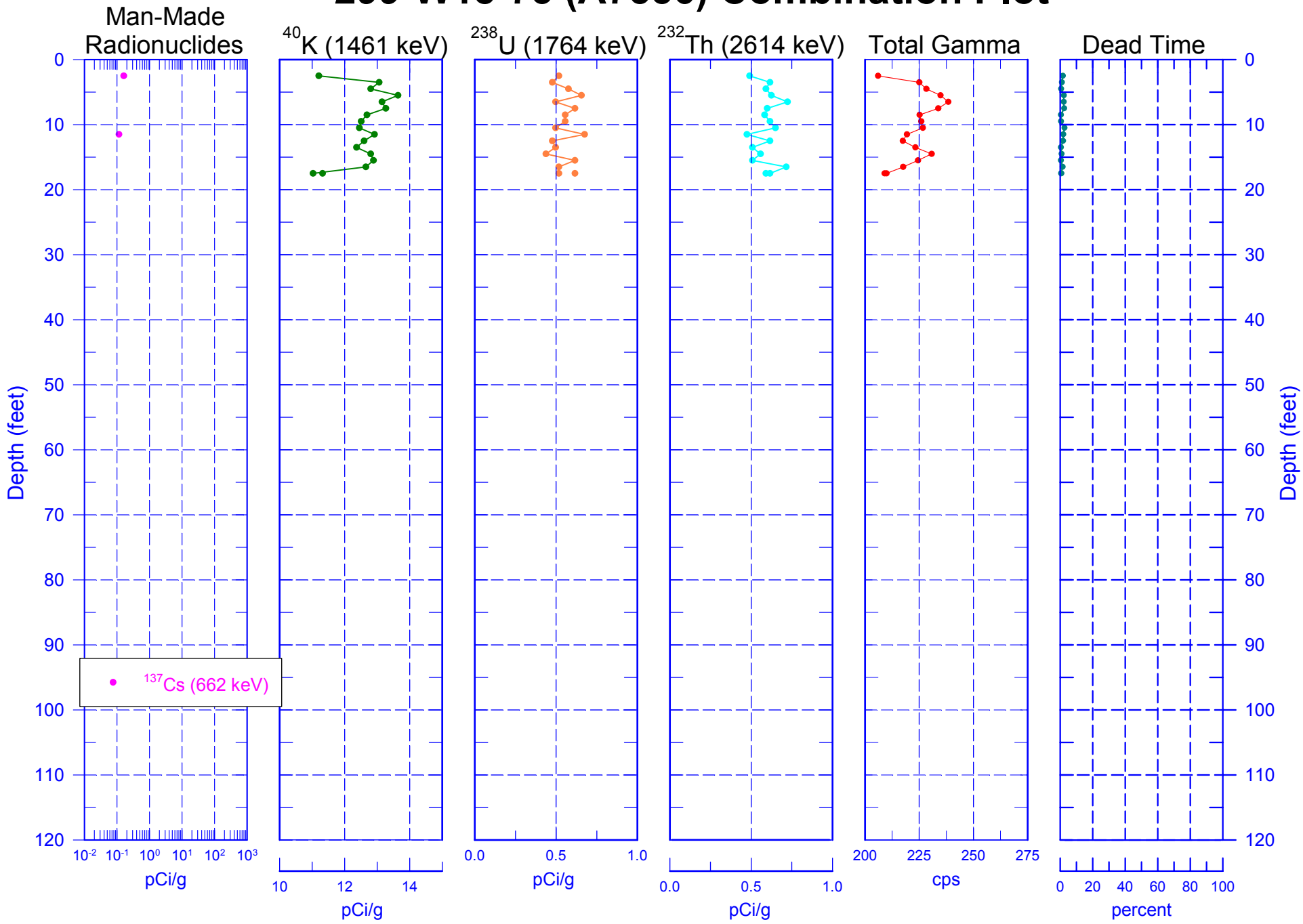
Zero Reference = Top of Casing

299-W18-73 (A7556)
Natural Gamma Logs



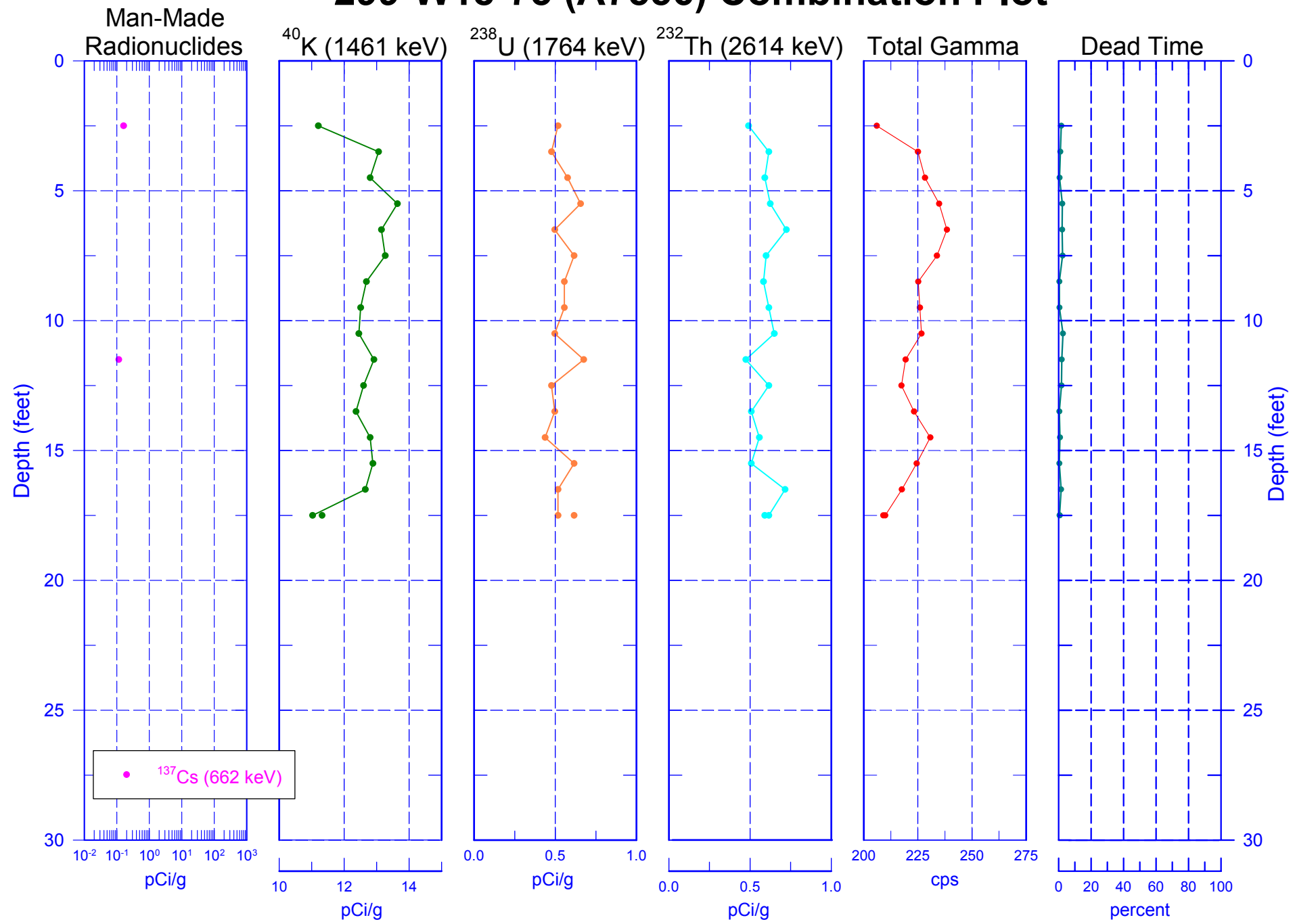
Zero Reference = Top of Casing

299-W18-73 (A7556) Combination Plot



Zero Reference = Top of Casing

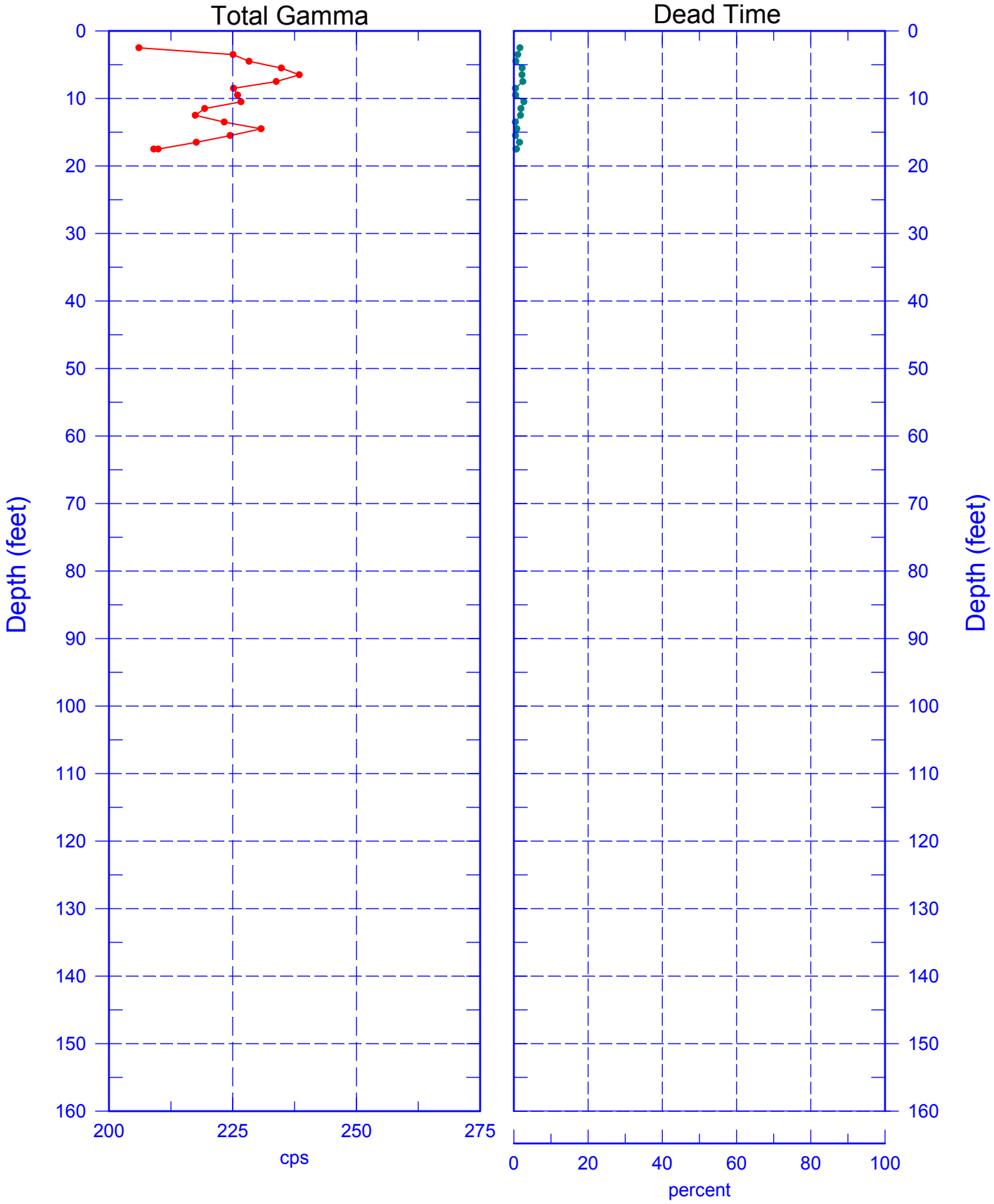
299-W18-73 (A7556) Combination Plot



Zero Reference = Top of Casing

299-W18-73 (A7556)

Total Gamma & Dead Time



Zero reference = Top of Casing